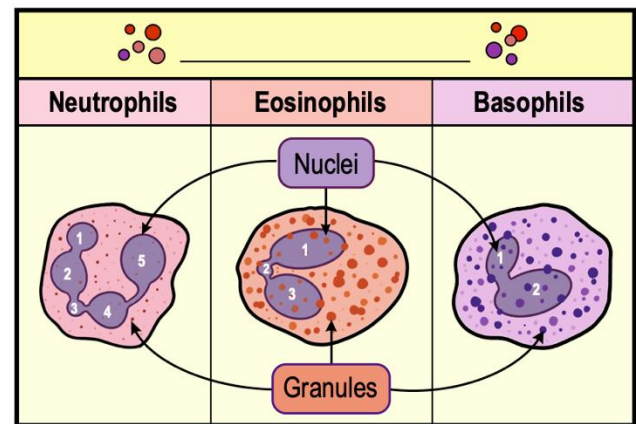
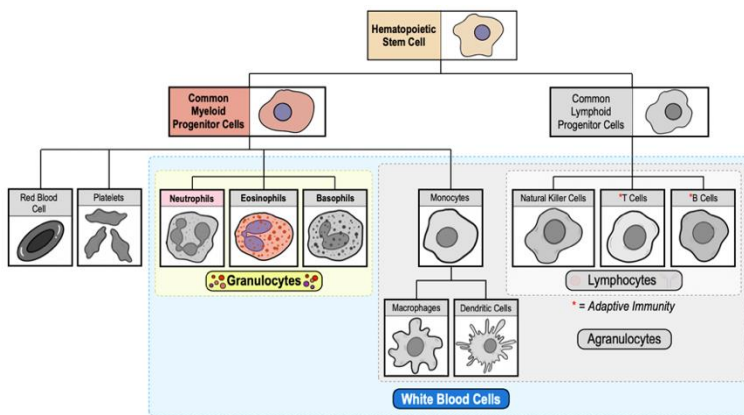


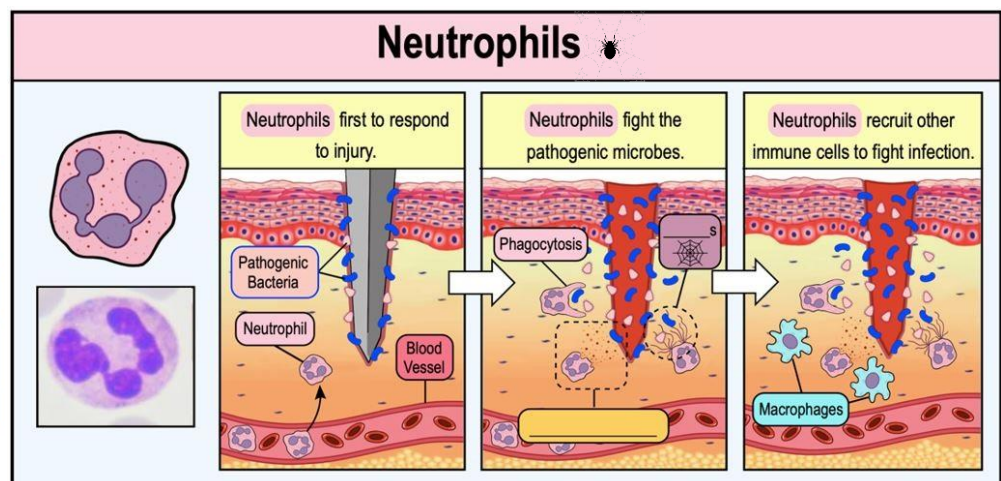
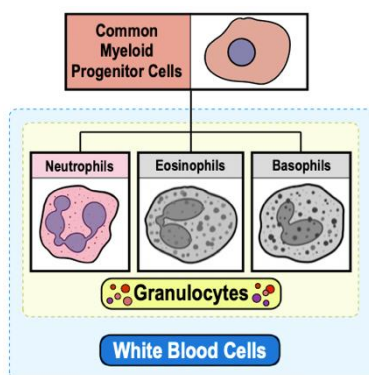
## CONCEPT: CELLS OF THE INNATE IMMUNE SYSTEM: GRANULOCYTES

- **Granulocytes:** white blood cells with visible cytoplasmic \_\_\_\_\_.
- **Granules:** contain compounds used for protective functions & are visible under a light microscope.
- There are \_\_\_\_\_ types of granulocytes named based on the staining properties of their granules:
  - 1) **Neutrophils:** have a nucleus with 5 lobes & small granules which do \_\_\_\_\_ stain well.
    - Also known as: **PolyMorphonuclear Neutrophils** (\_\_\_\_\_s).
  - 2) **Eosinophils:** have 2-3 lobes in the nucleus & large granules that stain a \_\_\_\_\_/orange color.
  - 3) **Basophils:** have a two-lobed nucleus & large granules that stain a dark \_\_\_\_\_/purple color.



## Neutrophils

- **Neutrophils** are the most \_\_\_\_\_ type of leukocyte in the blood (can make up to 70% of all leukocytes).
- Migrate to different locations via \_\_\_\_\_ stream & are often *first* to respond to infection or tissue damage.
- Granules contain variety of defensins & hydrolytic enzymes that \_\_\_\_\_ microbes.
- Granules can be \_\_\_\_\_ from the cell (**degranulation**) or used to destroy microbes during *phagocytosis*.
  - **Phagocytosis:** process of \_\_\_\_\_ & digesting material including invading microbes (cell "eating").
- Can also release neutrophil extracellular traps (NETs) or webs of chromatin that \_\_\_\_\_ infecting microbes.



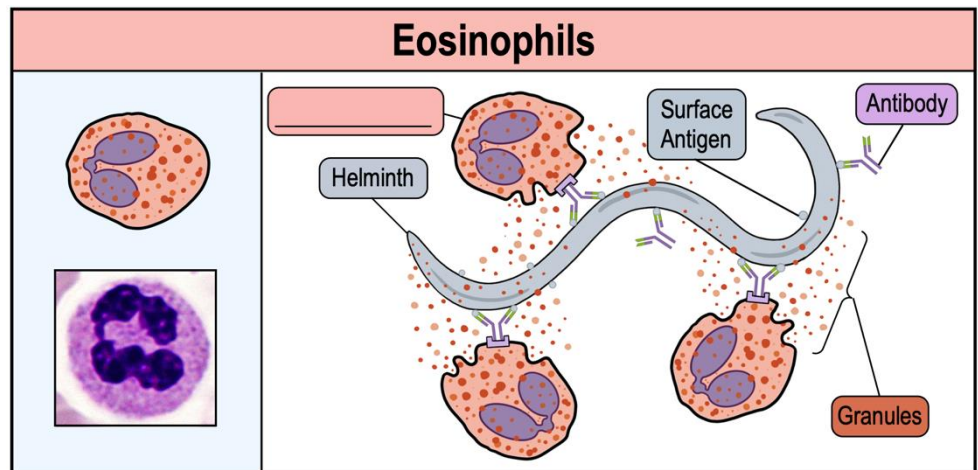
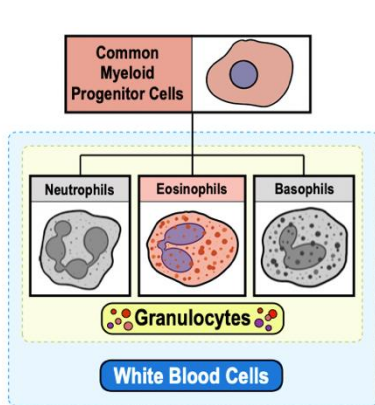
## CONCEPT: CELLS OF THE INNATE IMMUNE SYSTEM: GRANULOCYTES

**PRACTICE:** Which granulocyte is the first to respond to an infection, has hydrolytic enzymes in its granules, and possesses the ability of phagocytosis?

- a) Basophil.
- b) Eosinophil.
- c) Neutrophil.
- d) Macrophage.

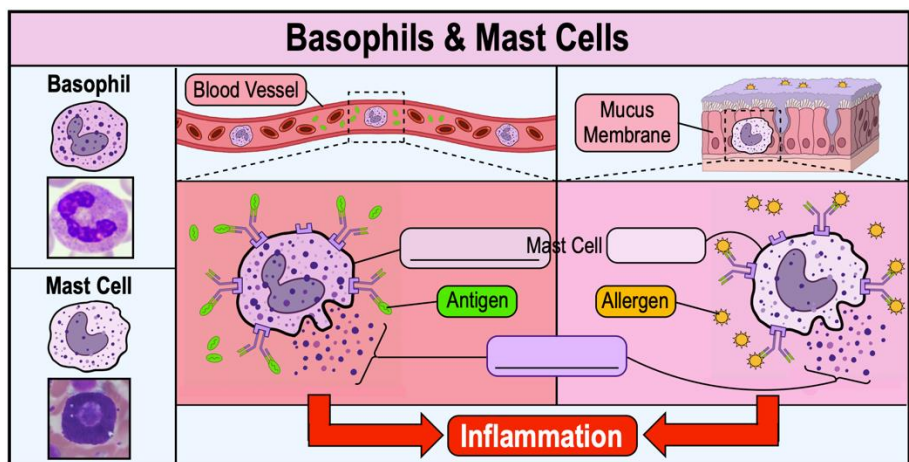
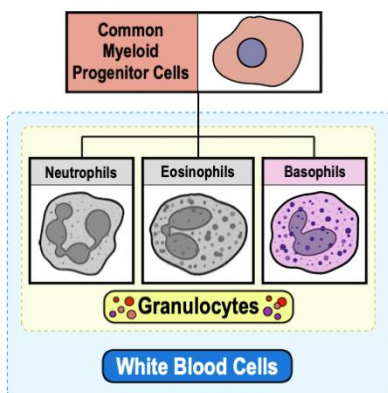
### Eosinophils

- Primary role of **Eosinophils** is to protect against parasitic \_\_\_\_\_ (helminths).
  - Granules have antimicrobial substances that bind parasites & enzymes that disrupt membrane permeability.
  - Can also cause some symptoms associated with \_\_\_\_\_.



### Basophils

- **Basophils:** are also involved in allergic reactions & inflammation response during infection.
  - Produce \_\_\_\_\_ that are released during inflammation to increase *capillary permeability*.
  - Allows other defense cells to easily \_\_\_\_\_ the bloodstream & enter an infected area of the host.
  - \_\_\_\_\_ **Cells:** similar in function to basophils but are found *inside tissues* rather than circulating the blood.
  - Detects tissue damage, *degranulates* to release *histamine*, which induces *inflammation*.



**CONCEPT: CELLS OF THE INNATE IMMUNE SYSTEM: GRANULOCYTES**

**PRACTICE:** Which of the following is a phagocytic cell found in the human body?

- a) Eosinophil.
- b) Neutrophil.
- c) Basophil.
- d) T cell.

**PRACTICE:** Which of the following answers are characteristics or roles of granulocytes?

- a) Release of hydrolytic enzymes that damage bacterial cell membranes.
- b) Production and release of histamines which increases capillary permeability.
- c) Release antimicrobial substances that damage the membranes of parasites.
- d) Phagocytose invading microorganisms.
- e) All of the above.

**PRACTICE:** White blood cells are referred to as \_\_\_\_\_.

- a) Platelets.
- b) Erythrocytes.
- c) Leukocytes.
- d) Megakaryocytes.

**PRACTICE:** Two immune cells have very similar functions. Both immune cells release histamine and induce inflammation.

However, \_\_\_\_\_ cells reside in specific tissues, while \_\_\_\_\_ cells travel through the blood stream.

- a) Mast cells; Basophil cells.
- b) Basophil cells; Neutrophil cells.
- c) Granulocyte cells; Basophil cells.
- d) Eosinophil cells; Dendritic cells.

**CONCEPT: CELLS OF THE INNATE IMMUNE SYSTEM: GRANULOCYTES**

**PRACTICE:** In type I allergic reactions, antibodies are produced and bind to:

- a) Mast cells.
- b) Neutrophils.
- c) Eosinophils.
- d) Monocytes.

**PRACTICE:** Granulocytes:

- a) Travel through the lymphatic system.
- b) Are the most numerous leukocyte in circulation.
- c) Develop in the thymus.
- d) Do not contain distinct granules in their cytoplasm.